

WHAT IS CLAIMED IS:

1. A method, comprising the steps of:

providing a window which is transmissive to  
radiation having a predetermined wavelength;

providing a frame which has an opening therethrough;

providing an annular sealing section between and in  
contact with each of said window and said frame, said  
sealing section extending completely around said opening;

heating said window, said frame and said sealing  
section to a selected temperature at which said sealing  
section has melted, said selected temperature being lower  
than melting temperatures of said frame and said window;  
and

thereafter cooling said window, said frame and said  
sealing section until said sealing section has solidified  
and formed between said window and said frame a hermetic  
seal which extends completely around said opening.

2. A method according to Claim 1, wherein said step  
of providing said frame includes the steps of:

using a metal to make said frame; and

oxidizing a surface portion of said metal frame  
which will be engaged by said sealing section.

3. A method according to Claim 2, wherein said step  
of providing said frame includes the step of selecting an  
ASTM F15 steel material for use as said frame.

4. A method according to Claim 2, wherein said  
oxidizing step includes the step of placing said frame in  
a wet nitrogen furnace while heating said frame.

5. A method according to Claim 4, wherein said step of heating said frame within said furnace is carried out by heating said frame to a peak temperature in the range of approximately 975°C to 1005°C for a time period in the range of approximately 9 to 13 minutes.

6. A method according to Claim 4, including prior to said oxidizing step the step of placing said frame in a wet hydrogen furnace while heating said frame.

7. A method according to Claim 6, wherein said step of heating said frame within said wet hydrogen furnace is carried out by heating said frame to a peak temperature of approximately 1050°C for a time period in the range of approximately 11 to 15 minutes.

8. A method according to Claim 1, including the step of selecting for use as said window a material which includes a borosilicate glass.

9. A method according to Claim 1, wherein said step of providing said window includes the step of forming an antireflective coating on a side of said window that will face said frame and be in contact with said sealing section.

10. A method according to Claim 9, wherein said antireflective coating is one of silicon oxide and magnesium fluoride.

11. A method according to Claim 1, including the step of selecting a glass material for use in said sealing section.

5 12. A method according to Claim 1, including the step of selecting for use in said sealing section first and second glass materials which are different, said first glass material being an annular portion of said sealing section which extends around said opening of said frame in contact with said window and spaced from said frame, said second glass material being an annular portion of said sealing section which extends around said opening of said frame in contact with said frame and spaced from said window, and said first and second glass materials being in contact with each other between said window and frame.

10 13. A method according to Claim 12, including the step of selecting for use in said sealing section a third glass material which is different from each of said first and second glass materials, and which is an annular portion of said sealing section that extends around said opening of said frame in contact with each of said frame and said window, said third glass material being disposed on a side of said first and second glass materials nearest said opening in said frame.

14. A method according to Claim 13, including the  
step of selecting for use in said sealing section a  
fourth glass material which is different from each of  
said first and second glass materials, and which is an  
annular portion of said sealing section that extends  
around said opening of said frame in contact with each of  
said frame and said window, said fourth glass material  
being disposed on a side of said first and second glass  
materials remote from said opening in said frame.

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15. An apparatus, comprising:

a window which is transmissive to radiation having a predetermined wavelength;

a frame which has an opening therethrough; and

5 an annular sealing section which is disposed between and fixedly bonds said window to said frame, said sealing section extending completely around said opening and providing a hermetic seal between said window and said frame at all locations therealong, and said sealing section being configured to melt at a temperature which is lower than melting temperatures of said frame and said window.

16. An apparatus according to Claim 15,

15 wherein said frame is made of a metal, and

wherein said sealing section contacts a surface portion of said frame which has been oxidized in a wet nitrogen atmosphere.

20 17. An apparatus according to Claim 16, wherein said frame is made of an ASTM F15 steel material.

18. An apparatus according to Claim 15, wherein said window includes a borosilicate glass.

25 19. An apparatus according to Claim 15, wherein said window has on a side thereof facing said frame an antireflective coating, said sealing section engaging said antireflective coating.

20. An apparatus according to Claim 19, wherein said antireflective coating is one of silicon oxide and magnesium fluoride.

5 21. An apparatus according to Claim 15, wherein said sealing section includes a glass material.

10 22. An apparatus according to Claim 15, wherein said sealing section includes first and second glass materials which are different, said first glass material being an annular portion of said sealing section which extends around said opening of said frame in contact with said window and spaced from said frame, said second glass material being an annular portion of said sealing section  
15 which extends around said opening of said frame in contact with said frame and spaced from said window, and said first and second glass materials being in contact with each other between said window and frame.

20 23. An apparatus according to Claim 22, wherein said sealing section includes a third glass material which is different from each of said first and second glass materials, and which is an annular portion of said sealing section that extends around said opening of said  
25 frame in contact with each of said frame and said window, said third glass material being disposed on a side of each of said first and second glass materials nearest said opening in said frame.

24. An apparatus according to Claim 23, wherein  
said sealing section includes a fourth glass material  
which is different from each of said first and second  
glass materials, and which is an annular portion of said  
sealing section that extends around said opening of said  
frame in contact with each of said frame and said window,  
said fourth glass material being disposed on a side of  
each of said first and second glass materials remote from  
said opening in said frame.

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